In the Claims:

1. (previously presented) A radiation therapy system comprising:

a radiation source that moves about a path and directs a beam of radiation towards an object;

a cone-beam computed tomography system comprising:

an x-ray source that emits an x-ray beam in a cone-beam form towards said object;

a flat-panel imager receiving x-rays after they pass through the object, said imager providing an image of said object, wherein said image contains at least three dimensional information of said object based on one rotation of said x-ray source around said object; and

a computer connected to said radiation source and said cone beam computed tomography system, wherein said computer receives said image of said object and based on said image sends a signal to said radiation source that controls said path of said radiation source.

2. (original) The radiation therapy system of claim 1, wherein said x-ray source comprises a kV x-ray source.

3. (previously presented) The radiation therapy system of claim 1, wherein said x-ray source emits x-rays with energies of approximately 100kV.

4. (previously presented) The radiation therapy system of claim 1, wherein said radiation source comprises a linear accelerator.

5. (currently amended) The radiation therapy system of claim 1, further comprising a stage that moves said object relative to said x-ray source and said ~~amorphous silicon~~ flat-panel imager.

6. (currently amended) The radiation therapy system of claim 5, wherein said stage rotates about an axis of rotation relative to said x-ray source and said ~~amorphous silicon~~ flat-panel imager.

7. (currently amended) The radiation therapy system of claim 2, further comprising a stage that moves said object relative to said x-ray source and said ~~amorphous silicon~~ flat-panel imager.

8. (currently amended) The radiation therapy system of claim 7, wherein said stage rotates about an axis of rotation relative to said x-ray source and said ~~amorphous silicon~~ flat-panel imager.

9. (currently amended) The radiation therapy system of claim 4, further comprising a stage that moves said object relative to said x-ray source and said ~~amorphous silicon~~ flat-panel imager.

10. (currently amended) The radiation therapy system of claim 9, wherein said stage rotates about an axis of rotation relative to said x-ray source and said ~~amorphous silicon~~ flat-panel imager.

11. (original) The radiation therapy system of claim 1, wherein said x-rays from said x-ray source are emitted along a source plane.

12. (original) The radiation therapy system of claim 6, wherein said x-rays from said x-ray source are emitted along a source plane that is perpendicular to said axis of rotation.

13. (previously presented) The radiation therapy system of claim 10, further comprising an alignment laser that allows visualization of said axis of rotation.

14. (currently amended) The radiation therapy system of claim 1, wherein said ~~amorphous silicon~~ flat-panel imager comprises an array of individual detector elements.

15. (original) The radiation therapy system of claim 14, wherein said array is a two-dimensional array.

16. (original) The radiation therapy system of claim 14, wherein each of said individual detector elements comprises a-Si:H photodiode.

17. (original) The radiation therapy system of claim 16, wherein each of said individual detector elements further comprises a transistor coupled to said Si:H photodiode.

18. (currently amended) The radiation therapy system of claim 1, wherein said computer receives said image from said ~~amorphous silicon~~ flat-panel imager and generates a computed tomography image of said object based on said received image.

19. (original) The radiation therapy system of claim 1, wherein said image is a two dimensional projection image.

20. (currently amended) The radiation therapy system of claim 19, wherein said computer receives said two dimensional projection image from said ~~amorphous silicon~~ flat-panel imager and generates a computed tomography image of said object based on said two dimensional projection image.

21. (currently amended) The radiation therapy system of claim 1, further comprising a gantry with a first arm and a second arm, wherein said x-ray source is attached to said first arm and said ~~amorphous silicon~~ flat-panel imager is attached to said second arm.

22. (original) The radiation therapy system of claim 21, wherein said gantry rotates about an axis of rotation.

Claims 23-25 (canceled)

26. (currently amended) A radiation therapy system comprising:

a radiation source that moves about a path and directs a beam of radiation towards an object;

a cone-beam computed tomography system comprising:

an x-ray source that emits an x-ray beam in a cone-beam form towards said object;

a flat-panel imager receiving x-rays after they pass through the object, said imager providing an image of said object;

a computer connected to said radiation source and said cone beam computed tomography system, wherein said computer receives said image of said object and based on said image sends a signal to said radiation source that controls said path of said radiation source; and

a gantry with a first arm portion and a second arm portion, wherein said x-ray source is attached to said first arm portion and said ~~amorphous silicon~~ flat-panel imager is attached to said second arm portion, wherein said gantry rotates about a first axis of rotation and said gantry is attached to a mobile platform that can translationally move on a floor of a room.

Claim 27 (canceled)

28. (original) The radiation therapy system of claim 1, wherein said radiation source operates at a power level higher than that of said x-ray source, wherein said radiation is of an intensity and energy that is effective for radiation treatment of an area of said object.

29. (original) The radiation therapy system of claim 21, wherein said radiation source operates at a power level higher than that of said x-ray source, wherein said radiation is of an intensity and energy that is effective for radiation treatment of an area of said object.

30. (previously presented) The radiation therapy system of claim 1, wherein said x-ray source rotates about an axis that is coincident with an axis of rotation of said radiation source.

31. (original) The radiation therapy system of claim 1, wherein said x-ray source is displaced relative to said radiation source.

32. (previously presented) The radiation therapy system of claim 1, wherein operation of said cone beam computed tomography system with an external trigger that controls a biological process of a patient in which said object is located.

33. (original) The radiation therapy system of claim 32, wherein said external trigger comprises an active breathing control mechanism.

34. (original) The radiation therapy system of claim 32, wherein said external trigger comprises a cardiac gating mechanism.

35. (original) The radiation therapy system of claim 1, further comprising an imaging device positioned opposite said radiation source and generating an image of said object based on radiation from said radiation source that passes through said object.

Claims 36-63 (canceled)

64. (previously presented) The method of claim 69, wherein x-rays within said x-ray beam have an energy of approximately 100kV.

65. (previously presented) The method of claim 69, comprising rotating about an axis of rotation said object relative to said x-ray source and said flat-panel imager.

66. (previously presented) The method of claim 69, wherein said flat-panel imager comprises an array of individual detector elements.

67. (original) The method of claim 66, wherein said array is a two-dimensional array.

68. (original) The method of claim 66, wherein each of said individual detector elements comprises a-Si:H photodiode.

69. (previously presented) A method of treating an object with radiation, comprising:

move a radiation source about a path;

direct a beam of radiation from said radiation source towards an object;

emitting an x-ray beam in a cone beam form towards an object;

detecting x-rays that pass through said object due to said emitting an x-ray beam with a flat-panel imager;

generating an image of said object from said detected x-rays, wherein said generating comprises forming a computed tomography image of said object based on said detected x-rays, wherein said image contains at least three dimensional information of said object based on one rotation of said x-ray source around said object; and

controlling said path of said radiation source based on said image.

70. (previously presented) A method of treating an object with radiation, comprising:

move a radiation source about a path;

direct a beam of radiation from said radiation source towards an object;

emitting an x-ray beam in a cone beam form towards an object;

detecting x-rays that pass through said object due to said emitting an x-ray beam with a flat-panel imager;

rotating about a first axis of rotation said object relative to said x-ray source and said flat-panel imager;

rotating about a second axis of rotation said object relative to said x-ray source and said flat-panel imager;

generating an image of said object from said detected x-rays, wherein said generating comprises forming a computed tomography image of said object based on said detected x-rays; and

controlling said path of said radiation source based on said image.

Claims 71-72 (canceled)

73. (original) The method of claim 69, further comprising correcting for offset and gain prior to said generating.

74. (previously presented) The method of claim 69, wherein said object comprises an animal.

75. (previously presented) The method of claim 74, wherein said image delineates soft tissue within said animal.

76. (original) The method of claim 75, wherein said soft tissue is selected from the group consisting of fat, a muscle, a kidney, a stomach, a bowel and a liver.

77. (previously presented) The method of claim 65, wherein said image is formed after one rotation of said body relative to said x-ray source and said flat-panel imager.

78. (previously presented) A method of treating an object with radiation, comprising:

move a radiation source about a path;

direct a beam of radiation from said radiation source towards an object;

emitting an x-ray beam in a cone beam form towards an object;

detecting x-rays that pass through said object due to said emitting an x-ray beam with a flat-panel imager;

generating an image of said object from said detected x-rays; and

controlling said path of said radiation source based on said image, wherein said x-ray beam is generated by an x-ray source that moves independently of said flat-panel imager, said x-ray source moves on a sinusoidal or sawtooth path constrained to a surface of a cylinder while said panel imager moves in a circular path on a surface of a cylinder.

79. (previously presented) The method of claim 78, further comprising adjusting a collimator in real time to adjust a shape of said x-ray beam so it is confined to an active area of said flat panel imager.

80. (previously presented) A method of treating an object with radiation, comprising:

move a radiation source about a path;

direct a beam of radiation from said radiation source towards an object;

emitting an x-ray beam in a cone beam form towards an object;

detecting x-rays that pass through said object due to said emitting an x-ray beam with a flat-panel imager;

generating an image of said object from said detected x-rays; and

controlling said path of said radiation source based on said image, wherein said x-ray beam is generated by an x-ray source that moves dependently of said flat-panel imager, said x-ray source and said flat-panel imager each moves on a sinusoidal trajectory on a spherical surface.

Claims 81-93 (canceled)

94. (currently amended) A radiation therapy system comprising:

a radiation source that moves about a path and directs a beam of radiation towards an object;

a cone-beam computed tomography system comprising:

an x-ray source that emits an x-ray beam in a cone-beam form towards said object;

a ~~silicon~~ flat-panel imager receiving x-rays after they pass through the object, said imager providing an image of said object;

a computer connected to said radiation source and said cone beam computed tomography system, wherein said computer receives said image of said object

and based on said image sends a signal to said radiation source that controls said path of said radiation source; and

a stage that moves said object relative to said x-ray source and said flat-panel imager, wherein combined motion of said cone-beam computed tomography system and said object moved by said stage achieves motion of said x-ray source upon a sphere.

95. (previously presented) The method of claim 65, wherein combined motion of said cone-beam and said object achieves motion of said cone beam upon a sphere.

96. (previously presented) A method of treating an object with radiation, comprising:

move a radiation source about a path;

direct a beam of radiation from said radiation source towards an object;

emitting an x-ray beam in a cone beam form towards an object;

detecting x-rays that pass through said object due to said emitting an x-ray beam with a flat-panel imager;

generating an image of said object from said detected x-rays, wherein said generating comprises forming a computed tomography image of said object based on said detected x-rays, wherein said image contains at least three dimensional information of said object based on one rotation of said x-ray source around said object; and

controlling a radiation therapy treatment plan involving said radiation source based on said image.

Claims 97-98 (canceled)

99. (previously presented) The method of claim 96, further comprising correcting for offset and gain prior to said generating.

100. (previously presented) The method of claim 96, wherein said object comprises an animal.

101. (previously presented) The method of claim 100, wherein said image delineates soft tissue within said animal.

102. (previously presented) The method of claim 101, wherein said soft tissue is selected from the group consisting of fat, a muscle, a kidney, a stomach, a bowel and a liver.

103. (previously presented) The radiation therapy system of claim 1, wherein based on said image and without human intervention, said computer sends said signal to said radiation source that controls said path of said radiation source in an automatic manner without human intervention.

104. (previously presented) The radiation therapy system of claim 1, wherein no enclosed opening is formed from a structure that supports said radiation source and said cone-beam computed tomography system into which said object is inserted for the purpose of being treated by said radiation source or imaged by said cone-beam computed tomography system within such an enclosed opening.

105. (previously presented) The radiation therapy system of claim 1, wherein no enclosed opening is formed from a structure that supports said radiation source into which said object is inserted for the purpose of being treated by said radiation source within such an enclosed opening.

106. (previously presented) The radiation therapy system of claim 1, wherein no enclosed opening is formed from a structure that supports said cone-beam computed tomography system into which said object is inserted for the purpose of being imaged by said cone-beam computed tomography system within such an enclosed opening.

107. (previously presented) The radiation therapy system of claim 1, wherein said flat-panel imager is an amorphous silicon flat-panel imager.

108. (previously presented) The radiation therapy system of claim 6, wherein said stage translates along said axis of rotation.

109. (previously presented) The radiation therapy system of claim 108, wherein said stage rotates about a second axis of rotation that is perpendicular to said axis of rotation.

110. (previously presented) The radiation therapy system of claim 108, wherein said stage rotates about a third axis of rotation that is perpendicular to said axis of rotation and said second axis of rotation.

Claim 111 (canceled)

112. (previously presented) The radiation therapy system of claim 26, wherein said flat-panel imager is an amorphous silicon flat-panel imager.

113. (previously presented) The method of claim 69, wherein said generated image is based solely on said detected x-rays, wherein said object is not moved by external devices during said detecting x-rays.

114. (previously presented) The method of claim 69, wherein said directing a beam of radiation and emitting an x-ray beam are performed simultaneously.

115. (previously presented) The method of claim 69, wherein said object is located at a single position during said emitting and said detecting and remains at said position during said controlling.

116. (previously presented) The method of claim 69, wherein said controlling said path is performed automatically and without human intervention.

117. (previously presented) The method of claim 69, wherein said flat-panel imager is an amorphous silicon flat-panel imager.

118. (previously presented) The method of claim 70, wherein said flat-panel imager is an amorphous silicon flat-panel imager.

Claim 119 (canceled)

120. (previously presented) The method of claim 78, wherein said flat-panel imager is an amorphous silicon flat-panel imager.

121. (previously presented) The method of claim 80, wherein said flat-panel imager is an amorphous silicon flat-panel imager.

122. (previously presented) The radiation therapy system of claim 94, wherein said flat-panel imager is an amorphous silicon flat-panel imager.

123. (previously presented) The method of claim 96, wherein said flat-panel imager is an amorphous silicon flat-panel imager.

124. (previously presented) The method of claim 96, wherein said generated image is based solely on said detected x-rays, wherein said object is not moved by external devices during said detecting x-rays.

125. (previously presented) The method of claim 96, wherein said directing a beam of radiation and emitting an x-ray beam are performed simultaneously.

126. (previously presented) The method of claim 96, wherein said object is located at a single position during said emitting and said detecting and remains at said position during said controlling.

127. (previously presented) The method of claim 96, wherein said controlling said path is performed automatically and without human intervention.

Claim 128 (canceled)